Amendments to the Specification:

Please amend page 1, line 1 to page 4, line 2 to read as follows:

~~Lubricating Oil Composition~~

~~[Technical Field]~~

TITLE OF THE INVENTION

Lubricating Oil Composition

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of International Application No. PCT/JP02/09122, filed September 6, 2002, the disclosure of which is incorporated herein by reference.

~~[Technical Field]~~ BACKGROUND OF THE INVENTION

This invention relates to lubricating oil compositions and more particularly to those which have excellent anti-wear properties and a long fatigue life, suitable for transmissions for automobiles.

~~[Background Art]~~

An automatic transmission for automobiles comprises a torque converter, a planetary gear unit, bearings, a wet clutch, and a hydraulic control unit controlling these components. However, in recent years, automatic transmissions have been susceptible to more sever load than ever due to the progresses of the development of high-powered engines and of the downsizing of automatic transmissions. Lubricating oils to be filled into such transmissions, i.e., transmission oils are required to have excellent extreme pressure properties and anti-wear properties while maintaining a high lubricity and a long fatigue life which is an ability to prevent pitching or flaking (defects at the lubricated surface because of being damaged) in bearings and gears for a long life.

In order to meet such requirements, it is known that for example lubricating oils such as automotive transmission oils are blended with sulfur- or phosphorus-based additives having excellent extreme pressure properties and anti-wear properties. While sulfur-based additives are excellent in extreme pressure properties, they can not avoid wears caused by corrosion and abrasion due to their strong activity to metal surfaces, leading to a problem when they are used alone. On the other hand, phosphorus-based additives are less in wear caused by corrosion and abrasion due to their weaker activity to metal surfaces, than the sulfur-based additives but often have problems due to the lack of extreme pressure properties to avoid

pitching or flaking when they are used alone in automatic transmissions where extreme pressure properties are required to be exhibited under severe conditions.

BRIEF SUMMARY OF THE INVENTION

In view of the foregoing circumstances, the object of the present invention is to provide a lubricating oil composition, particularly suitable as an automotive transmission oil, which is excellent in anti-wear properties and capable of inhibiting pitching, resulting in an improved fatigue life.

~~[Disclosure of the Invention]~~

After an extensive research and study, it was found that the use of the combination of specific boron-containing ashless dispersants, metal-based detergents, and alkali metal borates enables to produce a lubricating oil composition which is improved in anti-wear properties and capable of inhibiting pitching, resulting in an improved fatigue life.

That is, according to the present invention, there is provided a lubricating oil composition which comprises a lubricating base oil, (A) a boron-containing ashless dispersant in an amount of 0.02 to 0.1 percent by mass in terms of boron, based on the total mass of the composition, (B) an alkaline earth metal-based detergent with a base number of 0 to 500 mgKOH/g in an amount of 0.01 percent by mass or more in term of alkaline earth metal, based on the total mass of the composition, and (C) an alkali metal borate or a hydrate thereof.

In the present invention, Component (C) is preferably a potassium borate hydrate.

Component (C) is preferably contained in an amount of 0.002 to 0.1 percent by mass in terms of boron based on the total mass of the composition.

Component (A) is preferably a succinimide modified with a boron compound.

Component (B) is preferably an alkaline earth metal sulfonate or an alkaline earth metal salicylate.

Component (B) is preferably an alkaline earth calcium.

The lubricating oil composition is preferably used in an automatic transmission equipped with a wet clutch.

DETAILED DESCRIPTION OF THE INVENTION

The present invention will be described below in more detail.